

Operating Instructions

ALFRA 4-Station Combi Work Cart



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Technical specification:

Bending angle:	92° maximum
Cylinder path:	50 mm (work path max 40mm)
Bending:	120 x 12 mm copper or aluminium rails
Smallest leg length:	50 mm
Smallest U- bending:	100 mm
Smallest Z-bending:	72 mm
Punching:	120 x 12 mm copper or aluminium rails Round holes: Ø 6.6 – 21,5 mm. Center punching: max 110 mm rails. Oblong holes: up to a lenght of 21 mm max.

Purpose of unit

Mobile compact unit for work with components for construction of electric installations

Permanently installed are:

- **Punching and Bending Tool** (see individual description)
for punching and bending copper busbars
- **Cutting Tool** for cutting copper busbars

On demand the following can be added:

- **Cable press head**
- **Cabe cutting head**
- **Punching cylinder**

Others on request.

1. Functions and basic construction

A hydraulic pump mounted in the base stand of the unit runs four working units. Each unit can be operated individually by means of a magnet control valve. Units are run by a foot switch connected to the corresponding plug. Two working units (Puncher/Bender and Cutter) are permanently connected to the hydraulic pump by means of hydraulic pipes. The external units are provided from outside by hydraulic hoses. The individual supplies are electrically locked in order to avoid operating errors while simultaneously using several units.

Trolley

Frame construction, cased, moveable, with a sliding material support and tool deposit; serves as seat for working units, hydraulic unit, control unit and tool deposit.

Punching and Bending Unit

This unit is fully integrated in the frame. The table top serves as material support. Height adjustment of the punching and bending unit to the table top can be done by means of a hand wheel. An adjustable length fence is fixed to the table top. The fence can be folded down. For further details please see the special operating instructions and machine sketches.

Cutting Machine

Machine is mounted on the table and adjustable in height. The adjustable side fence is mounted to the table top and serves to adjust the width of the material related to the center of the cutting machine.

Full details to be seen in the description of the cutting unit.

External Units

As a rule the following units are connected by hoses:

- Cable Lug Clamps
- Punching Unit

Connection of other units possible. Full details can be seen in the individual operating instructions.

Hydraulic Unit

We use a hydro-compact pump unit of the company HAWE.

- Technical Features:
- max. pressure 700 bar
 - Output capacity 0.92 l/min
 - Directional seat valve block with four 3/2-port directional control valve and 24 V magnet control
 - Pressure switch unit with 600 bar presetting

Control Box

The complete electronic control (see enclosed circuit plan) is housed in a plastic standard casing. Easy access through the left sidedoor. Electric circuit protected by fine-wire fuse. These fuses and the circuit breaker for the plug are easy accessible by removing the cover plate.

A motor safety switch serves as overload protection of the 3-phase motor. The metallic components are earthed via PE-connection.

Storage Box

Punching tools can be deposited in provided inserts in the drawer.

The other drawers are for storing any other work papers and additional tools.

2. Operation

- Make electric connection (340/460 V, 50 cycles) by CEE-17 plug (5-poles)-
- Switch on main switch.
- Connect foot switch to the provided plug for the respective working unit.
- Prepare unit for operation in accordance with the individual instruction manual (adjusting height fences etc.).
- Actuate foot-switch.

3. Maintenance

The machine is made for tough use in workshops. Maintenance is limited to take care of sufficient oil level of the HÄWE hydraulic unit and the tightness of the hydraulic connections. We recommend to grease the basic and additional units with non-corrosive lubricating grease once per week in order to avoid excessive corrosion.

4. Safety

The unit is for use in workshop rooms. Outdoor operation will be allowed only if sufficient humidity protection is granted.

Only authorized persons who are familiar with the technique of the machine may operate the same.

The also supplied descriptions and instructions for the individual units have to be followed.

We recommend to train the operating staff before taking the machine into operation and to note this in the file.

Take care of sufficient illumination of the work place.

The separate units may be operated within the prescribed ranges only.

Safety devices may not be stopped.

If performing different operations simultaneously endangering of other persons must be excluded.

While working on the electrical unit the mains cable has to be taken off.

Repairs to be done by the expert only!

Attention!

The hydraulic units operate within a pressure range of approx. 700 bar!

Any manipulation of the pressure hoses is forbidden.

The flexible pressure hoses have to be protected from outside damages.

Repairs to be done by the expert only!

6. Busbar Bending and Punching Equipment

This machine is integrated in the work bench. It is designed for the bending of busbars made from copper or aluminium up to a diameter of 120 x 12 mm.

By means of the universal working cylinder, holes can be punched in the diameter range between 6.6 and 21.5 mm, also oblong holes.

6.1 Bending Busbars

Set the switch on the instrument panel to "Bending" and insert the bending die into the hydraulic cylinder. The electrical angle indicator has to be fixed at the round guide slot on the anvil. (As an option, you may use a digital angle indicator (prod. n° 03229). The contact cable has to be plugged into the socket on the backside of the working block.

The desired angle is fixed by means of a set screw on the angle scale.

It is recommended to adjust a 1 to 3° higher angle in order to correct spring back by the material.

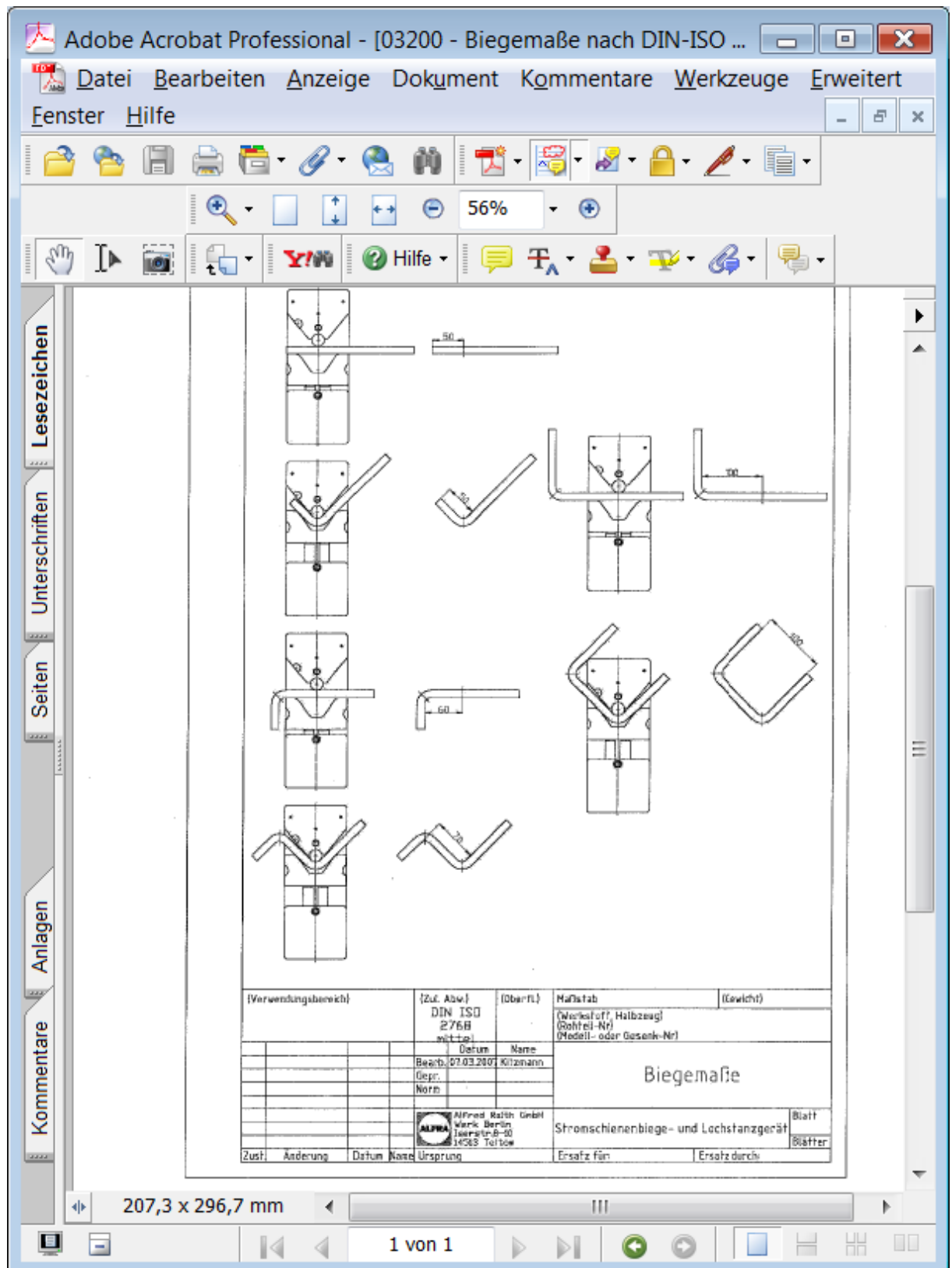
Thereafter the working block is set by means of the hand wheel to a height that corresponds to the width of the busbar (refer to the scale on the right side of the working block).

Always center material height to the axis of the working cylinder.

Close the protection cover and start the operation by pressing the "Start" button. If the operation has to be interrupted, slightly lift the safety cover or press "STOP" button. The hydraulic cylinder stays in the last position and enables the operator to check the adjustment again. To continue the operation, put the safety cover down into the end position and press "START" again.

When pressing "OUT", the hydraulic cylinder moves back into its start position.

Drawing on minimum bending angles



6.2 Punching

Set the switch at the basic unit to "PUNCHING". For punching operation, the bending die and the angle indicator have to be removed from the working block.

The punch with the neoprene stripper and pressure plate (up to 14 mm diameter) as well as the die are inserted into the provided borings of the working block.

The punch holder is fixed in the working cylinder by means of a small grub screw, opposite side of the height scale. Use the enclosed allen key.

According to the width of the busbar and the hole arrangement, the working block can be lowered stepless into the table.

6.3 Accessories

As mentioned before.

7. Busbar Cutting Machine

For clean and flash-free cutting of copper and aluminium busbars up to 120 x 10 mm.

Connect the foot switch to the tip jack "CUT".

The cutting machine is integrated in the work bench.

Before starting the operation the guide arrangement and the hold-down have to be adjusted. This way, straight cuts in the correct angle are achieved.

The upper knife can be exchanged and resharpened.

Cutting operation is started by using the foot switch and stopped by a preadjusted pressure control valve.

Attention! The busbar should always be inserted well centered to be the cutting knife. Always verify that the upper knife is sharp. Re-sharpen in time.

8. External units

Below the sliding material support you will find the tip jacks and the hydraulic connections for external units of our sales programme such as our hydraulic cylinder AEP1 for the punching of steel and aluminium sheets up to 2 mm and stainless sheet steel up to 1.5 mm.

Or you use our cable lug clamps or cable cutters with hydraulic connection.

The foot switch has to be connected with the relevant tip jack, the unit is connected by means of a hydraulic quick coupling.

Operation is started by foot switch, stop by means of a preadjusted pressure control valve.

ATTENTION!

We grant troublefree functioning only when using our own machines and equipment! Please follow the safety instructions.

CE Conformity Declaration

We declare under our exclusive responsibility that these machines...

- ALFRA Busbar Bending and Punching Unit 03200 with Hydraulic Pump SC 05 III**
- ALFRA Busbar Cutting Device 03250**
- ALFRA 4-Station Combi Work Cart 03980**
- ALFRA Busbar Bending and Punching Unit LPV**
- ALFRA Laminated Busbar Processing Machine 03300**

...correspond to the following standards and specifications:

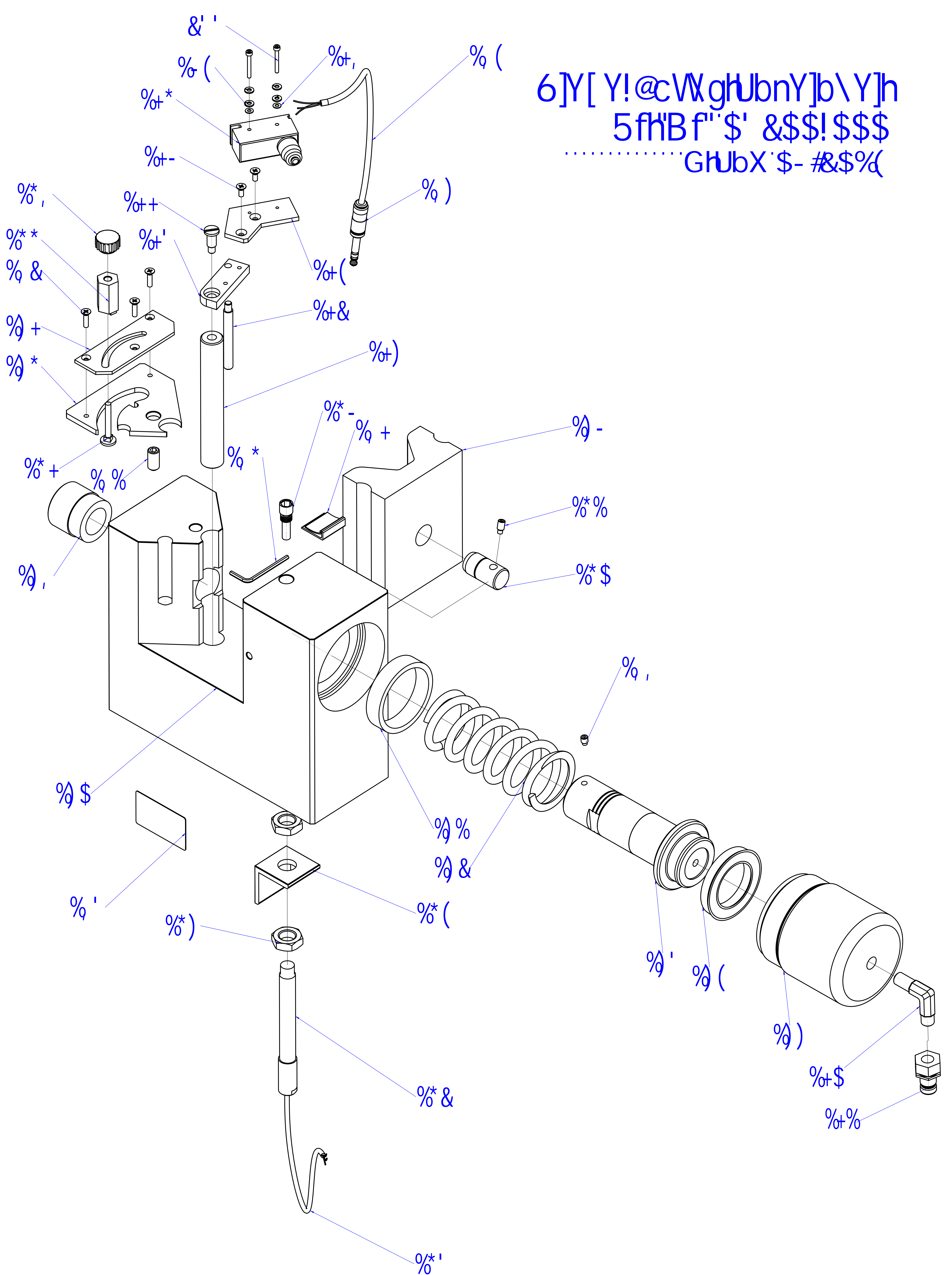
**9. GSGV Machine Regulation
Specification 89/392/EWG, version 91/368/EWG
Appendix I N° 1.7.4 of Regulation 89/392
Specification for Low Voltage 73/23 EWG
EN 292 Safety of Machines**

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If the electric tool is modified without our authorization, this declaration will lose its validity and the guarantee expires.

The sound pressure level at the work place might exceed 85 dp(A). In this case the user must wear ear protectors.

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Art.Nr.03980 Kombi-Bearbeitungswagen

Pos.Nr.	Menge	Artikel Nummer	Beschreibung
2	6	DIN 125-A8,4	Scheibe
3	1	DIN 625 - 6300 - 6,SI,NC,6_68	Kugelwälzlager
4	2	DIN912-M3x12 -8.8 -A2R	Zylinderschraube Verzinkt
5	2	DIN 912 M5 x 10 --- 10C	Zylinderschraube Innensechskant
6	4	DIN912-M5x6-8.8-A2R	Zylinderschraube verzinkt
7	1	DIN912-M6x8-8.8	Zylinderschraube verzinkt
8	6	DIN912-M6x20-8.8	Zylinderschraube verzinkt
9	2	DIN 912 M8x25-8.8 A2K	Zylinderschraube verzinkt
10	4	DIN 912-M10x20-8.8 A2K	Zylinderschraube verzinkt
11	4	DIN912-M10X30-8.8-A2K	Zylinderschraube verzinkt
12	2	DIN914-M6x10-A2K	Gewindestift mit Spitze
13	2	DIN84-M6x30-PA6.6	Zylinderschraube mit Schlitz
14	4	DIN933-M8x50	Sechskantschraube
15	6	DIN 915-M8X16-45H	Gewindestift
16	4	DIN934-M4.8	Sechskantmutter
17	9	DIN934-M6. 8	ISO 4032 M6-8 DIN 934
18	18	DIN934-M8.8	Sechskant mutter
19	4	DIN934-M10.8	Sechskantmutter
20	1	DIN7980-3-ST	Federring
21	4	DIN7980-10-ST	Federring
22	4	ISO7045-M4x10	Linsenkopf mit Kreuzschlitz
23	4	DIN9021-5,3-ST	Scheibe
24	1	DIN7984-M10x18-8.8	03200-017Zylinderschraube niedriger Kopf bearbeitet
25	6	DIN7991-M6x16- 8.8	Senkrschraube mit I-6kant
26	4	DIN7991-M8x12-8.8	Senkschraube mit I-6Kant
27	1	DIN7991-M6x12- 8.8	Senkrschraube mit I-6kant
28	4	DIN 7980 4mm	FederRing
29	1	03980-020	Schweißgruppe -Hubeinheit
30	1	03980-019	Kastenaunahme
31	1	03950-020	Abfallkasten
32	1	03980-039	Winkel für Kabelkanal
33	1	03980-057	Kabelkanal
34	1	03200-027	Umlegegriff-Handrad
35	1	03200-118	Stellingsanzeiger
36	1	03200-028A	Adapter für Handkürbel
37	1	03200-022	Aufnahme mit Bohrungen
38	1	DIN2093 40x20,4x1,5	Tellerfeder
39	1	03200-026	Spindel
40	1	03200-029	Beweglicher Kolben
41	4	03200-009	Stangendichtung 20x30x8
42	1	DIN522 30x6,4x2	Scheibe nachgearbeitet
43	1	03200-030	Zylinder mit Nut-gefertigt
44	5	DIN7980-6 F St	Federring
45	1	03980-035	Platte Kombibank
46	1	03200-012	Kolben fest
47	1	03200-008A	Buchse
48	1	03200-008B	Führungsband 087 9,7x2,5x85
49	1	03200-010	Zylinder-Rohr
50	1	DIN908-M10x1-11mm	23005-013-Verschlußschraube-RV10VS-ED

51	1	03200-047A	Kabel für den Haubenschlatter
52	1	03980-081	Hydraulikrohr 8x220 gebogen
53	1	03980-076	Anschlussklemm
54	1	23005-111	Distanzbolzen I-A M3x5
55	1	03980-034	Arretierung für Stellenanzeiger
56	1	03200-122	Kabelbindersockel 19x19
57	1	03980-000	Kabelbinder
58	1	03200-047	Präzisionschalter-Z-15 GS
59	6	03980-038A	Auflageplättchen
60	1	03250-018	Winkelverschraubung mit Entlüftungsschraube 1/4" NPT
61	1	03980-030	Einschraubverbinder-gerade RV08GE 1/4 "NPT-S
76	1	03980-017	Seitenblech
77	4	03200-051	Flanschbuchse
78	4	03980-096	Anschlusskabel 2y0,75²-500 mm
79	3	03980-094	Trennleiste-Buchse
80	3	03980-094	Trennleiste Stecker
81	1	03950-022	Hinweisschilde Schneiden-cutting
82	1	03980-018	Seitenblech LB
83	1	03200-049	Knebelschalter M22 WKV
84	1	03200-062	Adapter M22A
85	1	03200-067	Schließer M22-K10
86	1	03980-102	Kabelbrücke 1x0,75² 60 mm schwarz
88	1	03200-075	Schild Biegen-Lochen
89	1	03980-016	Frontblech
90	1	03980-054	Steckdose EL AQ1 F AP LG 44500
91	1	03852-021	Würgenippel M20x1,5 grau
92	1	23006-014	Kabelverschraubung M20x1,5 grau
93	1	03980-071	Mutter M20x1,5 grau
94	1	03980-053	CEE-Stecker 207 SP 400V 16A
95	1	03980-097	Anschlusskabel H07RN-F 3x1,5² 1400 mm
96	6	DIN7049 St-4,2x9,5	Linseblechschraube mit Kreutzzschlitz
97	21	ISO7045-M4x8	Linsekopf mit Kreuzschlitz
98	1	03980-105	Anschlusskabel 3x0,75² 500 mm
99	2	DIN934-M4.8	Sechskantmutter
100	1	03980-098	Anschlusskabel 5x1,5² 3000mm
101	2	DIN125-A4,3 140HV	Stahlscheibe
102	1	03200-121	Hinweisschilde -mittig Biegen
103	1	03200-067	öffner M22-K01
121	4	DIN912-M8x20-8.8-A2K	Zylinderschraube verzinkt
122	2	03980-029	Einschraubverbinder-gerade RV08GE-LR/ED
123	1	03980-022	Scweißgruppe 3
124	2	03980-028	Hydraulikschlauch 1200mm l.
125	1	03980-027	Hydraulikschlauch 750mm l.
126	1	03980-026	Hydraulikaggregat MP-34-H 1,25
127	1	03980-083	Hydraulikrohr 8x470 mm Gebogen
128	2	03980-033	Befestigung-Hydraulikaggregat
129	1	03980-085	Hydraulikrohr Ø8 x 100 mm gerade
130	1	03980-082	Hydraulikrohr 8x390 mm Gebogen
131	5	03200-109	Hydraulikkupplung Serie 115 NPT
132	2	020120-010	Nippel 1/4el NPT Ag-1000 Bar
133	1	03980-032	Adapter A04NM-A04NMF45K-45°
134	2	DIN7991-M6x16- 8.8	Senkrschraube mit l-6kant
135	1	03980-077	Entlüftungsschraube mit Meßstab
136	1	03980-031	RV08W-L
137	3	03200-018A	Winkelverschraubung RV08WE! /4" NPT-S
150	1	03200-082	Grundkörper
151	1	03980-175	Anschlagring
152	1	03200-076	Feder
153	1	03200-081	Kolben
154	1	03200-079	Stangenichtung/Zylinderdichtung 65x45x10
155	1	03200-078	Zylinder
156	1	03200-119	Führungsblech
157	1	03200-089	Skalenblec

158	1	03200-82A	Stützbuchse
159	1	03200-086	Biegematrize
160	1	03200-084	Stift
161	1	03200-085	Druckendes Federstück GN615-M8-K
162	1	03200-102	Rohr
163	1	03980-055	Sensor KIB-M12PS-002-KL2 10-60V DC
164	1	03200-115	Stützwinkel
165	2	DIN936-M16	Sechskantmuttern niedrige Form
166	1	03200-093	Klotz
167	1	03200-092	DIN603 6x40 Nachgearbeitet
168	1	03200-096	DIN467 M6-Rändelmutter GN 530-22-M6
169	1	03200-083	Schraube geliefert
170	1	A04NM-04NM90X	Winkelverschraubung
171	1	03200-077	Nippel
172	1	03200-100	Stift Lang
173	1	03200-094	Steg
174	1	03200-094B	Zwischenplatte
175	1	03200-091	Bolzen
176	1	03200-097E	Präzisionschalter RS-664-727
177	1	DIN923-M6x16	Flachkopfschraube
178	2	DIN125-A3,2 140HV	Stahlscheibe
179	2	DIN965-M4X10-4,8	Senkschraube mit Kreuzschlitz
180	3	DIN965-M4X16-4.8	Senkschraube mit Kreuzschlitz
181	1	DIN916-M10x20-45H	Gewindestifte mit Ringschneide
182	1	03200-099 0-55mm	Stahlmaß flexi
183	1	03200-113	Hinweisschild
184	1	03200-097B	Anschlußkabel
185	1	03200-097D	Klinkerstecker 6,3mm
186	1	DIN911-3mm	imbusschlüssel
187	1	03200-120	Flachbandkabelbehälter
188	1	DIN 915 M5X16-45H	Gewindestift
194	5	DIN127 A3 FSt	Federring 3,2
200	2	03250-001	Gegenmesser
201	2	03250-002	Abstandplatte
202	1	03250-003	Messer
203	1	03250-005	Messerbalken
204	1	03250-006	Stift
205	1	03200-009	Feder
206	1	03250-010	Plexiglas-hinten
207	1	03250-011	Plexiglas-Vorne
208	1	03250-012	Verbindungsstück
209	1	03250-013	Kolben
210	1	03200-079	Stangenichtung/Zylinderdichtung 65x45x10
211	1	03250-015	Zylinderglocke
212	1	03250-018	Platte-Brennteil mit Senkung
213	1	03250-019	Platte-Brennteil-mit gewinde
214	1	03250-021	Anschlagring
216	1	03250-024	Niederhalter
217	1	03250-025C	Winkel-Für Niederhalter
218	2	03250-029	Bodenwinkel
219	1	03250-036	Typenschild-1
220	1	03250-037	Typenschild-2
221	1	DIN934-M16	Sechskantmutter
222	4	DIN EN ISO 8734-10x70-m6	Zylinderstift gehärtet
223	4	DIN128-A8-FST	Spannscheibe
224	2	IN912-M6x20-8.8	Zylinderschraube
225	2	DIN 912-M8x16-8.8	Zylinderschraube
226	4	DIN 912 M8x60-8.8 A2K	Zylinderschraube verzinkt
227	1	03250-006A	Federndes-Druckstück GN615-M8-KS
228	8	DIN7985-M4x10-4.8	Linsenschraube mit Kreuzschlitz
229	1	03980-0037	Winkel-Endabschaltung
230	1	03200-097E	Präzisionschalter RS-664-727 Angepasst für SG
231	4	DIN 912-M4X12-8.8	Zylinderschraube
232	37	q	Stahlscheibe

233	2	DIN912-M3x25-8.8	Zylinderschraube
234	4	DIN125-A3,2 140HV	Stahlscheibe
235	1	03980-084	Hydraulikrohr 0,8x560mm
250	1	03980-001	
251	1	03980-317	Handgriff komplett angepasst
252	1	03980-316	Platte-33219
253	1	03980-002A	Edelstahlabeckung
254	1	03200-056B	Monobuchse
255	1	03980-013	Flexi-Maßstab 18x0,5x1000 mm
256	1	03980-079	Flexi-Maßstab 13x0,5x73mm
257	1	03980-011	Anschlag SG Alu
258	1	03980-010-	Nutensteig SG
259	1	DIN603-M10X60-4.6	Flachrundschraube mit vierkantsatz
260	1	03980-012	Klemmhebel mit mutter
261	1	03980-099 2x0,5²x420mm	Kabel für Monobuchse
262	6	DIN9021-6,4-ST	Scheibe
263	2	DIN603-M6X25-4.6	Flachrundschraube mit vierkantsatz
264	1	03200-042	Schützhaube
265	1	03200-044C	Winkelrechts
266	1	03200-044B	Winkellinks
267	1	03200-046	Klotz
268	1	03200-045	Sichtscheibe
269	2	DIN923-M4x2-5.8	Flachkopfschrauben mit Schlitz und Ansatz
270	4	DIN660 3x6mm	Hohlriet
271	1	03980-014	Hinweissschild für Strom.....
272	1	DIN923-M4x6-5.8	Flachkopfschrauben mit Schlitz und Ansatz
273	1	03200-073	Hinweißschild
274	1	03980-023	Schweißgruppe 4
275	1	03980-024	Schweißgruppe 5
276	1	03980-021	Schweißgruppe 2
277	2	03980-009	Bundbuchse
278	2	03980-025	Plastikkappe 30x30x3
279	1	03980-100	Pe-Leitung 620 mm
280	1	DIN46237-1,5-2,5/M4	Ringkabel schuh
281	1	03980-303	Typenschild
282	1	03980-002	Tischplatte
283	2	DIN7991-M6x10- 8.8	Senkrscharaube mit I-6kant
284	1	DIN 125-A10,5	Scheibe
285	1	03980-003	Lineal 30x6x635
287	2	DIN912-M8x12-8.8-A2K	Zylinderschraube verzinkt
288	4	DIN7991-M6x30-8.8	Senkschraube mit I6Kant
289	1	03980-004	Schieber
290	1	03980-006	Anschlag
291	1	03980-005	Klemmhebel mit Schraube
292	1	DIN 915 M5X16-45H	Gewindestift
293	2	DIN439-M4-8	Sechskantmutter flach
294	1	DIN7984-M4x8-8.8-A2R	Zylinderschraube
295	2	DIN6798-A4,3-FST	Fächerscheibe
296	8	DIN912-M5x6-8.8-	Zylinderschraube verzinkt
297	2	DIN 137 B16-St	Federscheibe
298	2	DIN934-M6 4.8	ISO 4032 M6-8 DIN 934
299	1	03980-007	Rolle 6x520 Ig
300	2	03980-008	Winkel Rollenfixierung
301	4	DIN965-M4X6-4,8	Senkschraube mit Kreuzschlitz
302	1	DIN125-A4,3 140HV	Stahlscheibe
303	1	DIN 912-M4X6-8.8	Zylinderschraube
304	1	03980-021	Werkzeugeinsatz

